E/1999/31
E/CN.16/1999/9

United Nations

Commission on Science and Technology for Development

Report on the fourth session
(17–21 May 1999)

Economic and Social Council
Official Records, 1999
Supplement No. 11

Economic and Social Council
Official Records
Supplement No. 11 (E/1999/31–E/CN.16/1999/9)

Commission on Science and Technology for Development

Report on the fourth session (17–21 May 1999)

United Nations • New York, 1999

Note

Symbols of United Nations documents are composed of capital letters combined with figures. Mention of such a symbol indicates a reference to a United Nations document.

ISSN 1020-2056

Summary

At its fourth session, the Commission on Science and Technology for Development considered seven substantive items, including the examination of a report on the main theme for the session, "Science and technology partnerships and networking for national capacity-building". Other substantive agenda items covered the report of the panel on biotechnology; the common vision on the future contribution of science and technology to development; budget and inter-sessional activities of the Commission; the coalition of resources; actions arising from the third session; and the role and activities of the Commission regarding the coordination of science and technology for development. After consideration of the substantive agenda items, the Commission adopted an omnibus resolution, entitled "Science and technology for development", which addressed all the major issues discussed at the fourth session, and recommended it for adoption by the Economic and Social Council.

In the above-mentioned resolution, it was decided that the substantive theme and the focus of the Commission's work during the inter-sessional period 1999–2001 would be "National capacity-building in biotechnology". Panels or working groups of the Commission would analyse and make recommendations on a number of issues related to the subject, including human resource development through basic science education, research and development, and the interdisciplinary aspects thereof; the transfer, commercialization and diffusion of technology; the improvement of public awareness and participation in science policy-making; and bioethics, biosafety, biodiversity, and the legal and regulatory matters affecting these issues to ensure equitable treatment.

Regarding science and technology partnerships and networking for national capacity-building, it was recommended that, *inter alia,* Governments foster partnerships by identifying priority areas for technological development, and the major technological needs of domestic firms, as well as useful services that could assist both foreign and domestic institutions interested in forming partnerships, and by exploring ways and means of enhancing and supporting partnerships, including the creation of an enabling environment, the improvement of research and development activities and infrastructures, and the raising of public awareness. It further requested that the secretariat of the Commission identify and analyse best practices in partnering and networking, and build an inventory of opportunities for international science and technology partnerships and networking. It was also recommended that the Commission collaborate more closely with other United Nations bodies to promote science and technology partnerships, and that the least developing countries, particularly those in Africa, support their integration into the global process of scientific knowledge and technology mobilization.

Furthermore, the Economic and Social Council would recommend that the Commission, through its secretariat, initiate a dialogue among entities in the field of biotechnology in order to foster information exchange and to raise global development issues. The resolution also outlined a series of strategies that developing countries and countries with

economies in transition might undertake to enhance the benefits of food production biotechnology, and the Commission's secretariat was requested to disseminate balanced information and examine case studies of approaches to addressing related issues such as intellectual property rights and biosafety.

The Economic and Social Council would also recommend, under the same resolution, that the secretariat of the Commission continue its work on the coalition of resources and on the science, technology and innovation policy reviews and undertake a series of measures to strengthen the functioning of the Commission in the context of its restructuring, including its role regarding the coordination of science and technology for development.

The Commission also recommended the adoption by the Economic and Social Council of one draft decision in which the Council would approve the provisional agenda and documentation for the fifth session of the Commission, and of another draft decision in which the Council would decide to extend the mandate of the Gender Advisory Board until 30 June 2001. In another action, the Commission approved the text on the common vision to be delivered at the forthcoming World Science Conference of the United Nations Educational, Scientific and Cultural Organization.

Contents

Chapter		*Page*
I.	Matters calling for action by the Economic and Social Council or brought to its attention	1
	A. Draft resolution	1
	B. Draft decisions	6
	C. Decision brought to the attention of the Council	7
II.	Substantive theme: Science and technology partnerships and networking for national capacity-building	8
III.	Panel on biotechnology	12
IV.	Common Vision on the future of science and technology for development	14
V.	Budget and inter-sessional activities of the Commission	20
VI.	Coalition of resources	21
VII.	Action arising from the third session	22
VIII.	Role and activities of the Commission regarding the coordination of science and technology for development	24
IX.	Election of the Chairperson and other officers for the fifth session of the Commission	25
X.	Provisional agenda and organization of work of the fifth session of the Commission	26
XI.	Election of the Chairperson of the fourth session of the Commission	27
XII.	Adoption of the report of the Commission on its fourth session	28
XIII.	Organization of the session	29
	A. Opening and duration of the session	29
	B. Attendance	30
	C. Election of officers	30
	D. Agenda and organization of work	31
	E. Documentation	31
Annexes		
I.	Attendance	32
II.	List of documents before the Commission at its fourth session	34

Chapter I

Matters calling for action by the Economic and Social Council or brought to its attention

A. Draft resolution

1. The Commission on Science and Technology for Development recommends to the Economic and Social Council the adoption of the following draft resolution:

Science and technology for development*

The Economic and Social Council,

Recognizing the role of the Commission on Science and Technology for Development as a forum for the examination of science and technology questions, for improving understanding of science and technology policies for development, and for the formulation of recommendations and guidelines on science and technology matters within the United Nations system, all in relation to development,

Recognizing also that the Commission, in carrying out its work, should pay special attention to the needs and requirements of developing countries, in particular the least developed countries and landlocked and small island developing States, and that it should take into consideration the relevant problems of countries with economies in transition,

Taking note with appreciation of the report of the Commission's Working Group on Science and Technology Partnerships and Networking for National Capacity-Building,[1] and the report of the Panel Meeting on Biotechnology for Food Production and Its Impact on Development,[2]

Recognizing that the economic potential of science and technology partnerships and networking is enormous, and that the risks for those without the capabilities to form equitable partnerships and participate in networks may lead to their marginalization from active participation in the global economy,

Aware of the extremely precarious situation of science and technology in some countries, particularly those in Africa, and of the need for these countries to overcome the constraints that have adverse effects on the well-being of people, the development of nations and the competitiveness of their economies,

Noting with satisfaction the notes by the secretariat on a common vision on science and technology for development,[3] on budget and inter-sessional activities of the Commission[4] and on the coalition of resources,[5] and other relevant documentation submitted to the Commission for consideration at its fourth session,[6]

---

* For the discussion, see chap. II.

[1] See E/CN.16/1999/2.

[2] See E/CN.16/1999/3.

[3] E/CN.16/1999/4 and Corr. 1.

[4] E/CN.16/1999/5.

[5] E/CN.16/1999/6.

[6] E/CN.16/1999/7 and 8, and E/CN.16/1999/Misc.1–5.

Recognizing the importance of science, technology and innovation policies and noting with satisfaction that two such reviews, for Colombia and Jamaica,[7] have been completed, and that others are under way or awaiting financing,

Noting that the fourth session of the Commission is taking place twenty years after the United Nations Conference on Science and Technology for Development was held in Vienna, and reaffirming the increasing importance of science and technology in effectively addressing development challenges, and the role that the United Nations can play in this area,

Recalling Economic and Social Council resolutions 1997/62 of 25 July 1997 on science and technology for development, and 1998/46 of 31 July 1998 and 1998/47 of 31 July 1998, as adopted, on the restructuring and revitalization of the United Nations in the economic, social and related fields,

Recognizing that enhanced transparency and accountability are essential for the efficient and effective functioning of the Commission,

Welcoming the initiative taken by the United Nations Educational, Scientific and Cultural Organization in holding the World Science Conference in June 1999,

Activities as follow-up to the earlier work of the Commission

A. Science and technology partnerships and networking for national capacity-building

1. *Recommends* that developing countries and countries with economies in transition should identify, in cooperation with all stakeholders:

(a) Priority areas for the development of technological capacity, where international partnerships and networking could play an essential role;

(b) The major needs of domestic firms in terms of technology, expertise and know-how, in order to map out clear objectives, expected output and monitoring tools;

(c) Useful services that could be provided to foreign public and private institutions interested in forming partnerships with domestic public and private institutions and that could help in establishing more equitable and balanced partnerships;

2. *Also recommends* that Governments should explore ways and means of fostering partnerships among public and private institutions, *inter alia*, by creating an enabling policy, regulatory and legal environment, and by contributing information and knowledge, financing the development of research and development activities and infrastructure, and raising public awareness of the role and benefits of partnerships and networking in science and technology, and, where such processes already exist, that they should be updated;

3. *Further recommends* that Governments should support partnerships and networking for both basic and applied research, with a view to enhancing national capacity-building;

4. *Requests* the secretariat of the Commission, using the resources it can mobilize, to:

(a) Identify and analyse best practices in partnering and networking;

[7] *Science, Technology and Innovation Policy Review: Jamaica* (United Nations publication, Sales No. E.98.II.D.7); and *Science, Technology and Innovation Policy Review: Colombia* (United Nations publication, Sales No. E.99.II.D.13).

(b) Build an inventory of opportunities for international science and technology partnerships and networking;

5. *Invites* Governments, the public and business sectors, academia and non-governmental organizations in industrialized countries to engage in partnerships and networking in science and technology with their counterparts in developing countries and countries with economies in transition in order to facilitate access to and the use and adaptation of new technologies, and to improve their technological capability and build national capacity;

6. *Recommends* that, given the extent of the burgeoning energy demand and the financial constraints in developing countries, partnerships and collaboration on renewable as well as on conventional sources of energy, such as those envisaged in the clean development mechanism and the "joint implementation" arrangements envisioned in the context of the Kyoto Protocol[8] to the United Nations Framework Convention on Climate Change,[9] should be increased in order to:

(a) Promote capacity-building in developing countries;

(b) Provide modern energy services to rural and unserved urban populations;

(c) Encourage private sector participation in the provision of electricity supplies under innovative arrangements such as build-operate-transfer or build-operate-own schemes;

7. *Also recommends* that the Commission should collaborate more closely with United Nations bodies and specialized agencies of the United Nations system, in particular the United Nations Conference on Trade and Development, the United Nations Educational, Scientific and Cultural Organization, the United Nations Industrial Development Organization, the United Nations Development Programme, the World Bank, the World Health Organization, the Food and Agriculture Organization of the United Nations and the World Intellectual Property Organization, to promote science and technology partnerships;

8. *Further recommends* that the least developed countries, particularly those in Africa, should support their effective integration into the global process of mobilization of scientific knowledge and available technology, especially by:

(a) Supporting all initiatives aimed at the subregional regrouping of resources in the area of science and technology for development;

(b) Identifying equitable partnerships and placing due value on their scientists;

(c) Creating centres of excellence in priority areas, and enhancing local education in science and technology skills;

B. Biotechnology for food production

9. *Further recommends* that the Commission on Science and Technology for Development, through its secretariat, should initiate a dialogue that involves the private and the public sectors, non-governmental organizations and specialized biotechnology centres and networks, such as the Global Forum on Agricultural Research, with a view to fostering the exchange of information and ideas among scientists, policy makers, representatives of industry and end-users. Such a dialogue can also provide a forum in which to raise issues concerning global developments in biotechnology (such as intellectual property rights, biosafety, bioethics, pharmo-foods and "terminator" genes) and to raise

[8] FCCP/CP/1997/7/Add.1, sect. I, decision 1/CP.3 of 11 December 1997, annex.
[9] A/AC.237/18 (Part II)/Add.1 and Corr.1, annex I.

public awareness and create better understanding of the potential benefits of biotechnology and other critical issues;

10. *Further recommends* that Governments in developing countries and countries with economies in transition should undertake, with the cooperation of the international community, the following strategies:

(a) Strengthen research capability, build national capacity in biotechnology and undertake training programmes to provide a skilled workforce;

(b) Identify and encourage the development of "centres of competence" in biotechnology in each country;

(c) Develop and maintain partnerships with "centres of excellence" and networks in all countries;

(d) Encourage linkages and interaction among public and private sectors and research and development institutions;

(e) Encourage the participation of the scientific community in policy discussions on biotechnology, biosafety and bioethics and in increasing public understanding of the risks and benefits of this new technology;

11. *Requests* the secretariat of the Commission to:

(a) Assist in identifying and disseminating balanced information on biotechnology, intellectual property rights and biosafety;

(b) Examine case studies of approaches to address issues related to technology, intellectual property rights and biosafety issues in a practical, understandable and concrete way;

12. *Requests* the Commission to collaborate with the United Nations Conference on Trade and Development in preparing the next issue of the Advanced Technology Assessment System bulletin on biotechnology for food production;

13. *Recommends* that the Commission and its secretariat should cooperate with other international and regional organizations active in biotechnology, such as the United Nations regional commissions, the United Nations Environment Programme, the United Nations Industrial Development Organization, the Food and Agriculture Organization of the United Nations, the International Centre for Genetic Engineering and Biotechnology, the World Bank, non-governmental organizations, and other international institutions such as the Consultative Group on International Agricultural Research, particularly to build understanding and to exchange information on biosafety regulation and capacity-building, including through case studies on (a) partnerships in biotechnology, (b) biosafety, (c) bioethics and (d) approaches to biotechnology and intellectual property rights issues;

C. Coalition of resources

14. *Requests* the secretariat of the Commission, using the extrabudgetary resources already allocated for this purpose, to finalize the publication of the reports on the coalition of resources for the application of information and communications technologies in transmissions infrastructure, education and health, and to ensure the widest possible dissemination of the final report;

D. Science, technology and innovation policy reviews

15. *Recommends* that the Commission should continue to liaise with the United Nations Conference on Trade and Development on science, technology and innovation

policy reviews with interested countries in order to identify options for national action, especially those that foster technological capability and innovation and the transfer and diffusion of technology;

E. New substantive theme and other activities

16. *Decides* that the substantive theme for the inter-sessional period 1999–2001 will be "National capacity-building in biotechnology", with particular attention to agriculture and the agro-industry, health and the environment. The theme will include: human resource development through basic science education, research and development, as well as their interdisciplinary aspects; the transfer, commercialization and diffusion of technology; increasing public awareness and participation in science policy-making; and bioethics, biosafety, biodiversity, and the legal and regulatory matters affecting these issues to ensure equitable treatment;

F. Coordination of science and technology for development in the United Nations system

Mindful of the need to continue strengthening the functioning of the Commission in the context of its restructuring, including its role regarding the coordination of science and technology for development,

Welcoming the steps taken by the secretariat of the United Nations Conference on Trade and Development to establish a Web site for the dissemination of information regarding the activities of the Commission,

17. *Urges* the secretariat of the Commission to continue efforts, in collaboration with other United Nations bodies, including the regional commissions and the Ad Hoc Open-ended Working Group on Informatics, to establish an electronic network linking information on their activities in science and technology for development and to build awareness of scientific developments that are particularly important for fostering economic and social development;

18. *Requests* the secretariat to continue to issue the regular newsletter updating activities in the United Nations system pertaining to science and technology for development, including information on plans for and the results of the inter-sessional activities of the Commission itself;

19. *Calls upon* the secretariat and Bureau of the Commission to identify and take advantage of opportunities to interact closely with bodies of the United Nations system in order to promote greater information exchange and coordination of activities in science and technology for development; such interaction should include participation by the secretariat in the relevant coordination meetings of the Consultative Committee on Substantive Questions (Operational Activities);

20. *Recommends* that every other year one panel meeting should be held in Geneva, following which the Bureau shall meet the Geneva-based delegations of member States and observers for one day to discuss with the delegations the status of the inter-sessional activities of the Commission and its efforts to coordinate activities of the United Nations system pertaining to science and technology for development,

21. *Agrees* to keep an item in its agenda entitled "The functioning of the Commission on Science and Technology for Development, including its role in coordinating science and technology for development", and requests the secretariat to prepare a succinct analytical report on relevant activities within the United Nations system, including the outcome of the World Science Conference, for consideration under this item.

B. Draft decisions

2. The Commission on Science and Technology for Development recommends to the Economic and Social Council the adoption of the following draft decisions:

Draft decision I

Report of the Commission on Science and Technology for Development on its fourth session and provisional agenda and documentation for the fifth session of the Commission*

The Economic and Social Council:

(a) Takes note of the report of the Commission on Science and Technology for Development on its fourth session and endorses the resolutions and decisions adopted by the Commission;

(b) Approves the provisional agenda and documentation for the fifth session of the Commission set out below.

Provisional agenda and documentation for the fifth session of the Commission on Science and Technology for Development

1. Adoption of the agenda and other organizational matters.

2. Substantive theme: "National capacity-building in biotechnology", with particular attention to agriculture and the agro-industry, health and the environment. The theme will include: human resource development through basic science education, research and development, as well as their interdisciplinary aspects; the transfer, commercialization and diffusion of technology; increasing public awareness and participation in science policy-making; and bioethics, biosafety, biodiversity, and the legal and regulatory matters affecting these issues to ensure equitable treatment.

   Documentation

   Report of the Secretary-General

3. Comprehensive note on implementation and progress made on decisions taken at the fourth session of the Commission.

   Documentation

   Note by the secretariat

4. Presentation of country reports on technology and innovation policies.

5. Budget of the Commission.

   Documentation

   Note by the secretariat

* For the discussion, see chap. X.

6. Activities of the Commission regarding the coordination of science and technology for development and other inter-sessional activities.

Documentation

Note by the secretariat

7. Election of the Chairperson and other officers for the sixth session of the Commission.

8. Provisional agenda and organization of work of the sixth session of the Commission.

9. Other matters.

10. Adoption of the report of the Commission on its fifth session.

Draft decision II

Gender Advisory Board*

The Economic and Social Council decides:

(a) To extend the mandate of the Gender Advisory Board until 30 June 2001 in order to allow it to complete its work programme within the extrabudgetary resources allocated for this purpose;

(b) That the Bureau should consult with the members of the Commission on Science and Technology for Development to fill the two vacancies on the Gender Advisory Board from among the members of the Commission in order to ensure continued linkages between the Board and the Commission;

(c) That the Commission on Science and Technology for Development should assess at its fifth session the desirability of continuing the work of the Board and the potential for obtaining external resources to do so.

C. Decision brought to the attention of the Council

3. The following decision adopted by the Commission on Science and Technology for Development is brought to the attention of the Economic and Social Council:

Decision 4/1

Chairman's summaries of the discussions

At its 10th meeting, on 21 May 1999, on the proposal of the Chairman, the Commission on Science and Technology for Development decided to include the Chairman's summaries of the discussions at its fourth session in the report of the Commission on that session.

* For the discussion, see chap. VII, paras. 10–14.

Chapter II

Substantive theme: Science and technology partnerships and networking for national capacity-building

1. The Commission considered agenda item 2 at its 1st, 2nd and 10th meetings, on 17 and 21 May 1999. It had before it a report by the secretariat of the United Nations Conference on Trade and Development (UNCTAD) on the work of the Working Group on Science and Technology Partnerships and Networking for National Capacity-Building (E/CN.16/1999/2).

2. At the 1st meeting, the Vice-Chairperson, Mr. B. M. Rode (Austria), made an introductory statement.

3. At the same meeting, statements were made by the representatives of Jamaica, Indonesia, Cameroon, Angola, Cuba, Romania, the Philippines, Brazil, Sri Lanka and Pakistan, as well as by the observers for Uruguay and Turkey.

4. At the 2nd meeting, on 17 May, statements were made by the representatives of Slovakia, Ghana, the Russian Federation, Germany, China, Bolivia, Spain, the Islamic Republic of Iran, the United States of America, Belarus, Colombia, Tunisia, Angola, Guinea, the Republic of Korea, Brazil, Cameroon, Jamaica and Romania, as well as by the observer for Egypt.

Chairperson's summary of the general discussion

5. The Working Group on Science and Technology Partnerships and Networking for National Capacity-Building, in its report and recommendations, raised several policy issues for consideration by the different stakeholders involved in the process of partnerships and networking. "Partnerships" are considered herein to refer to both bilateral and multilateral alliances formed for the mutual benefit of those concerned (see E/CN.16/1999/2, para. 15). Among the broad policy questions concerning partnerships and networks between academic and research institutions as well as private enterprises and firms considered by the Working Group were the following:

(a) Has a new era of networks and partnerships emerged and have they become an essential form of strategic interaction for firms and institutions?

(b) Under what conditions do they present new opportunities and constraints for firms and institutions from developing countries and economies in transition with respect to building indigenous capacity and technological capability?

(c) What might Governments and the international community do to promote this process?

6. The work of the Working Group led to the preparation of, in addition to its report, several background documents dealing with partnerships and networking in energy and biotechnology. A list of these documents is attached to the Working Group's report (E/CN.16/1999/2, annex II).

7. As regards the emergence of the "knowledge-intensity of production" and competition based on price as well as on non-price-based factors such as innovation, the response of the private enterprise sector has been to resort to the increased use of partnerships and networking. Evidence suggests that the stiff challenges associated with globalization have resulted in marked increases in inter-firm partnerships and networking aimed at pooling

resources to share the costs and risks of research and development activities. This is as valid for firms in developing countries as it is for those in developed countries, and the trend is not likely to be reversed in the near future. Moreover, these new forms of collaboration have been recognized as inevitable options, rather than choices, for many firms trying to remain competitive in today's tough global markets, which are characterized by the application of information technologies and Internet-based, technology-intensive modes of production and distribution. The success of such partnerships may often depend on the simultaneous involvement of private enterprises, academic institutions and government agencies.

8. Increases in partnerships and alliances have been observed at many levels and in many parts of the world, including between firms and institutions in both the North and the South, particularly those located in South-East Asia. Inter-firm technology agreements have also been on the increase in a wide range of developing countries. These alliances have become one of the most prominent forms of business conduct and technology transfer and, in combination with educational networks, form the basis for local capacity-building in many developing countries. Hence, a marked increase in alliances between various types of research and technology networks, centres of excellence, academia and business has been observed.

9. The Working Group has addressed the policy options and practical measures needed to promote technology partnerships and networking for national capacity-building in developing countries and countries in transition. Partnerships and networking are considered effective mechanisms for technological development, national capacity-building and increased market access. Governments have a very important role to play in promoting partnerships and networking, particularly in developing countries, along with international and regional organizations and multilateral financial institutes, to complement these efforts.

10. There is broad consensus on the Working Group's proposals on: (a) designing a methodology based on best practices in inter-institutional partnering and networking; (b) developing criteria to measure success; and (c) building an inventory of opportunities for international science and technology partnerships and networking. In this respect, the European Union's experience with and guidelines on building consortia and partnerships for the transfer of technology could be studied and used to learn more about effective partnering. Other existing research alliances such as those in operation in the Americas could also be used. Partnerships and networks between institutions of higher learning should be evaluated with regard to their effectiveness and capabilities for human capacity-building, diffusion of knowledge and technology transfer. More specifically, there is a need to examine the limitations of networks and partnerships, to study the conditions under which they contribute to human and technological capacity-building, and to differentiate between different types of partnerships. In this way, the main factors associated with both success and failure could be identified.

11. The importance of an enabling and supportive environment for partnership is stressed. Experience has shown that successful partnerships tend to be bottom up rather than top down, that is to say, they are formed at the initiative of the partners themselves. There are, however, certain prerequisites for them to thrive, not least of which is an appropriate mix of policies and incentives for all parties involved. The question of achieving more equal or balanced partnerships between unequal partners has been repeatedly brought up. Pro rata contributions, whether based on a country's gross domestic product (GDP), enterprise earnings or university income, as the case may be, have been used successfully to this end. The capacity gap between partners at different levels of development, however, requires a longer-term and more broadly based solution. Given the growing technology gap not only between but also within countries, it has been suggested that more emphasis should be put on scientific education in national science and technology policies. At a more technical level,

national research and development capacity and infrastructure could be strengthened by promoting partnerships and networks that enable scientists and technicians from developing countries to upgrade their skills and access research and development resources and developments. Therefore, there is a need to help these countries increase their participation in networking and partnerships through practical action programmes.

12. Another requirement for attracting and achieving effective partnerships is access to telecommunications and the Internet. While there is concern that the lack or absence of these facilities could lead to rapid economic marginalization, examples do exist of international development projects that are aimed at assisting and facilitating telecommunication linkages in remote areas. The development of information technology applications, such as the creation of virtual laboratories, libraries and information centres, might even change the nature of partnerships and become an essential component of efficient networks.

13. On the other hand, there are elements that could impede the successful participation of developing countries in partnerships. The debt burden of many developing countries, especially the least developed countries, just does not in many cases allow for science and technology investments. Countries that have managed to arrange overseas training for their scientists often lose their education investment when those scientists opt to remain abroad. Networks that provide continuous contact between the educational institutions involved and the place of work of the graduates can considerably reduce the danger of this brain drain. Furthermore, the source of funding is cited as an element that sets the agenda and defines the priorities of partnerships; in a partnership of unequals, the needs and goals of the weaker partner are often overlooked. It is therefore important that potential partners should have a realistic view of each other's goals and motivations, as well as of existing market forces. Mutual understanding of the partners' cultural and mental approach to problem-solving is created in successful partnerships and networks and forms another valuable component of these types of cooperation. There is also a need to examine more closely the incentives and opportunities for firms from developed countries to enter into partnerships with firms from developing countries.

14. In spite of the possible disadvantages that could result from a partnership, the benefits are evident. Foremost among these are economies of scale, the availability of funding for innovative activities and technological upgrading, and the generation of new knowledge. The improved technical capacities for product design and manufacturing efficiency of many South-East Asian firms, for example, have been attributed to their links with clients abroad. Similarly, cleaner processes and products have resulted from the combined efforts of conventional energy firms. Partnerships and collaboration on both renewable energy and conventional energy have to increase above present levels to provide modern energy services to rural and unserved urban populations. As regards conventional energy, attention needs to be paid to partnerships with stronger developmental impacts. Similarly, the provision of electricity supplies under innovative arrangements that involve partnerships with the private sector should be encouraged.

15. The Commission stresses the role of the international community in the promotion of science and technology partnerships, and recommends closer collaboration with United Nations bodies and specialized agencies of the United Nations system, including UNCTAD, the United Nations Educational, Scientific and Cultural Organization (UNESCO), the United Nations Industrial Development Organization (UNIDO), the World Health Organization (WHO), the Food and Agriculture Organization of the United Nations (FAO) and others, to achieve this end. The Commission also stresses the importance of paying as much attention to human resources and institutional aspects as to financial processes and "hardware". The social, legal and environmental aspects of cooperation in networks have

to be skilfully studied and will form, together with political stability, important factors for success.

Action taken by the Commission

16. At its 10th meeting, on 21 May 1999, the Commission had before it the text of a draft resolution entitled "Science and technology for development", which was submitted by the Chairman on the basis of informal consultations.

17. At the same meeting, before the adoption of the draft resolution, statements were made by the representatives of Angola, Cameroon, the Russian Federation, Sri Lanka, the United States of America, Colombia and the Islamic Republic of Iran.

18. Also at the 10th meeting, the Secretary made a statement on the programme budget implications of the draft resolution.

19. At the same meeting, the Chairman read out the agreed amendments to the draft resolution.

20. Also at the 10th meeting, the Commission adopted the draft resolution, as orally amended (for the final text, see chap. I, sect. A).

Chapter III
Panel on Biotechnology

1. The Commission considered agenda item 3 at its 3rd, 4th and 10th meetings, on 18 and 21 May 1999. It had before it a report by the secretariat of UNCTAD on the work of the meeting of the Commission Panel on Biotechnology for Food Production and Its Impact on Development (E/CN.16/1999/3).

2. At the 3rd meeting, on 18 May, a panel of three experts on biotechnology for food production made presentations on biotechnology and its impact on development and identified critical issues relevant to the development of biotechnology, with particular attention to food production.

3. At the same meeting, statements were made by the representatives of Jamaica, Cameroon, Cuba, Sri Lanka, China, the Russian Federation, Colombia, Indonesia, the Philippines, Guinea, Ghana, Uganda, Romania, Germany and the United States of America.

4. At the 4th meeting, on 18 May, panellists responded to some of the issues raised at the third meeting.

Chairman's summary of the general discussion

5. The Panel on Biotechnology for Food Production and Its Impact on Development, in its discussions and report to the fourth session, focused on three thematic aspects:

(a) Issues related to plant and animal species and their traits;

(b) Endogenous capacity-building for the development and transfer of biotechnology, including mechanisms for integrating biotechnology into the mainstream of agricultural research;

(c) Other critical issues related to biotechnology, which may have an impact on food production, particularly those that need to be addressed at the international level.

6. Several members of the Commission praised the secretariat and the Panel on biotechnology for their hard work in preparing a valuable, lucid and balanced report. It was emphasized that agricultural biotechnology offers the potential for increasing and improving food production, easing the problem of food security, which is currently a major concern in many low income countries, and providing the opportunity for enhancing inward investment. Although the report focused on biotechnology for food production, the discussion also emphasized the potential of biotechnology in diverse areas such as pharmaceuticals, the exploitation of marine resources and combating deforestation. Members noted that more attention needed to be paid to these areas. Furthermore, it was noted that, because of its low capital-intensity in both research and development and production activities, even small low-income economies can develop competence and capacity in biotechnology. Many developing countries conduct research in biotechnology and efforts are under way in many countries, including African countries, to develop and apply the results of biotechnology research for food production. It was noted, however, that while the progress made to date was encouraging, generally, biotechnology had had a slow start in developing countries, in particular African countries. Lack of clearly defined national policy on biotechnology, limited manpower and the prevalence of economic and social problems were identified as the main reasons. The possible use of research and development networks to strengthen local capacity in biotechnology was discussed. As many institutions

in the South are doing relevant research in these areas, South-South cooperation is thought to be another avenue to be supported.

7. With regard to the development and diffusion of biotechnology, it was emphasized that, while national level research and development efforts were critical in order to ensure, among other things, that local conditions were taken into account, knowledge-sharing through North-South and South-South partnership and networking and regional initiatives were crucial for effective transfer and diffusion of technology. Other critical factors include resource mobilization and specialized training to develop the capacities required for research and development, risk assessment and the designing and monitoring of biosafety guidelines. Closer collaboration between research and development institute and the users of genetically modified organisms was also highlighted as an essential element in advancing local capability in biotechnology. This requires, *inter alia*, active participation of the private sector and the involvement of local scientists in decisions regarding biotechnology and in educating the public about the benefits and potential dangers of genetic manipulation. However, it was stressed that, because of the pivotal role of biotechnology for food production, health and sustainability, it was imperative that decisions on the development and diffusion of biotechnology should not be exclusively trade- and market-driven.

8. Some members expressed concern about the possible limitations posed by intellectual property rights (IPR) on the transfer of biotechnology to developing countries and suggested that the Commission might wish to explore this issue further. It was also noted, however, that property rights had important roles in stimulating innovation and creating an environment attractive to investment. An issue of broad concern in biotechnology is biosafety, in particular the impact of the release of genetically modified organisms (GMOs) developed in the North into tropical environments. Several members emphasized that the need to meet the food demands of rapidly rising population would require countries to take advantage of biotechnology but noted that this should happen with due regard for the safety of the environment. The introduction of "terminator" genes was cited as one example of an advance in biotechnology that could have adverse economic effects on small farmers in developing countries. One of the problems in assessing the broader implications of GMOs is lack of complete research and information. It was noted that additional information and a database covering a wider spectrum of GMOs were needed in order to better understand both the pattern of development and the possible implications of GMOs for the environment. There is also a need to preserve biodiversity and to strengthen the capacity of developing countries to establish biosafety procedures and to participate in inventories of their genetic resources. The importance of gathering detailed information through case studies of specific projects on biotechnology in both developed and developing countries was highlighted.

Action taken by the Commission

9. At its 10th meeting, on 21 May 1999, the Commission adopted a draft resolution entitled "Science and technology for development" (see chap. II, paras. 16–20; for the final text, see chap. I, sect. A).

Chapter IV

Common Vision on the future of science and technology for development

1. The Commission considered agenda item 4 at its 4th, 5th, 9th and 10th meetings on 18, 19 and 21 May 1999. It had before it a note by the secretariat of the United Nations Conference on Trade and Development (UNCTAD) entitled "A common vision on science and technology for development" (E/CN.19/1999/4), as well as a number of other background documents, including a summary report by the UNCTAD secretariat of an expert group meeting on this subject (E/CN.16/1999/Misc.1), a paper on a framework for a common vision (E/CN.16/1999/Misc.4) and a paper on making North-South research networks work, prepared at the request of the UNCTAD secretariat by the European Centre for Development Policy Management, Maastricht, Netherlands, with the financial support of the Government of Austria (E/CN.16/1999/Misc.5).

2. At the 4th meeting, on 18 May, the Vice-Chairperson, Mr. A. Ventura (Jamaica), made an introductory statement.

3. At the same meeting, statements were made by the representatives of Uganda, the Russian Federation, Cuba, Austria, Angola, Belgium, China, Romania, Colombia, Spain, the United States of America, the Republic of Korea and Tunisia, as well as the observer for Uruguay.

4. At the same meeting, a representative of the United Nations Educational, Scientific and Cultural Organization (UNESCO) made a presentation on the forthcoming World Science Conference, to be held from 25 June to 1 July 1999 in Budapest, Hungary, to examine and adopt a world declaration and an agenda-framework for action on science and the use of scientific knowledge.

5. At the 5th meeting, on 19 May, statements were made by the representatives of Pakistan, the United States of America and Uganda.

6. At the same meeting, a concluding statement was made by the Vice-Chairperson, Mr. A. Ventura (Jamaica).

7. At the 9th meeting, on 21 May, statements were made by the representatives of the United States of America, Spain, Germany, Uganda, Greece, Austria, Cameroon, China and Slovakia.

Chairman's summary of the general discussion

8. The work of the Commission on a common vision on the future contribution of science and technology to development was undertaken in the period following the second session of the Commission in 1995. The subject was considered at four expert group meetings. The results of those meetings were summarized in several reports prepared by the UNCTAD secretariat, including those submitted to the current session, in particular the note on a common vision contained in document E/CN.16/1999/4, which highlighted the major issues and ideas involved.

9. Any approach to the future of science and technology should take into account the concerns of a broad range of actors and stakeholders in development, the scientific and research and development community and non-governmental organizations. The elements of a common vision need to reflect both the varied interests and perceptions of these different development actors and the changes that have occurred at the global level.

10. Science and technology will face in the future a number of important challenges related in particular to the changes in the structure of world economy, to the changing roles of the major development actors and to the introduction of new technologies and the various environmental, legal and moral problems connected with their application. The formulation of a common vision is intrinsically connected with the objective of achieving such vital goals as the elimination of poverty and the implementation of the concept of global entitlement to knowledge, which, in turn, is closely related to the need to provide access to information and to related technical and financial resources. Science and technology is important in improving the quality of life of the world's population, particularly the most vulnerable and disadvantaged groups, including women. Multidisciplinary approaches that link various types of science (such as the physical and social sciences) would help to respond to equity and gender concerns. The elimination of illiteracy and the provision of vocational training and science education, which are important for the development of science and technology capabilities, should be a priority for all people and for the international community.

11. Members of the Commission have raised a number of issues relevant to finalizing the work on a common vision. One of the major challenges that policy makers have to face is how to transform scientific and technological knowledge into an easy-to-access and rapid vehicle for economic and social progress with a view to achieving sustainable development. A key role in this challenge is played by public policies, including in the areas of science and technology focused on providing an enabling environment, on innovation and on technology diffusion. Serious efforts should be made at the international, regional and national levels to produce a generally accepted conceptual and procedural framework defining those science and technology policy dimensions that could directly influence science and technology knowledge production, distribution and use, namely, policy targets, policy tools and achievement indicators. In this connection, there is a need for scientific literacy for all and greater public awareness and participation in decision-making.

12. Capacity-building is regarded by the Commission as an essential element of a common vision and it cannot be developed without deliberate national policies, including a long-term commitment and funding for scientific and technological development. It was emphasized that a large investment was needed, particularly in Africa, to create science and technology infrastructures and to build indigenous capacity. In order to allow the least developed countries to build their technological capacity, it was suggested that official development assistance (ODA) should be increased to the target level of 0.7 per cent of gross national product (GNP).

13. Education is considered to be among the main avenues for introducing new technologies and for capacity-building. Basic science education is central to the generation of future technologies. The Commission's previous work on information technology networking has shown that there are new means for achieving this. These include virtual laboratories, Internet access to libraries, remote learning and the use of networking to generate and diffuse knowledge. Networking should include the exchange of staff and students both to build capacity and to enhance mutual understanding. Networking, through the use of information technologies, can also provide opportunities for the creation of "centres of excellence" and learning institutions in remote areas, and for the exchange of experiences and understanding of different approaches to developmental problems.

14. Closely related to education and capacity-building is the problem of the brain drain. Conditions should be established, with the help of international support measures, to encourage qualified young people to work in their own country. At the same time, efforts should be made to create a globalized scientific community and promote integration between cultures. Networking can assist in the creation of complementarities between various

institutions, while networking among research institutions can allow researchers to interact with other researchers.

15. Ways must be found to place science and technology in the hands of those most in need and thus enable them to join the mainstream of their economies and communities. The scientific community should see this not as a marginal task, but as a central focus of its research. To bring this about, a new vision of science in the service of humanity will need to be developed and widely shared. In this way, science and technology will be better able to attack the scourge of poverty which affects so many on our planet.

16. In much the same way as the scientific community must focus more on societal needs, so too must social scientists turn their attention to the generation, diffusion and impact of technology and the institutions and cultures inherent in this process. In this connection, there is a critical need to identify emerging technologies and to study their impact on production and society.

17. New technologies can make a very useful contribution to progress towards an interdependent world, provided that they are used in a peaceful manner in accordance with international law. The future development of technologies, such as biotechnologies, should be seen in the context of development and societal needs as a whole. Issues of legal protection and the acceptance of new technologies by a large segment of the population should be examined.

18. In view of the benefits of new technologies, manufacturing technologies should not be overlooked. In this context, it is of the utmost importance to assure in all countries, particularly developing countries, the establishment of effective quality control and standardization procedures, so that the International Organization for Standardization (ISO) 9000 standard can be achieved by as many enterprises as possible: this would enhance the countries' competitive position. Government policies and infrastructure facilities, including systems of certification and training, should be established and strengthened.

19. There is a need to address the challenges that science and technology development pose to traditional ways of dealing with intellectual property rights. As much attention should be devoted to science and technology policy as is devoted to monetary and fiscal policies.

Action taken by the Commission

20. At its 10th meeting, on 21 May 1999, the Commission had before it a text entitled "A Common Vision", submitted by the Vice-Chairperson, Mr. A. Ventura (Jamaica), on the basis of informal consultations.

21. At the same meeting, statements were made by the representatives of the United States of America, Spain, Germany, Uganda, Greece, Austria and Cameroon.

22. Also at the 10th meeting, the Commission approved the text, as orally amended for inclusion in the report of the Commission (for the final text, see below):

A Common Vision

1. Science and technology should be considered the common heritage of mankind. The triumphs of scientific discovery and technological innovation have greatly increased our understanding of the world we live in and the benefits we derive from

it, but these benefits have been unevenly distributed across nations and within them. The process of rapid accumulation of knowledge and skills evident in some parts of the world has not reached the hundreds of millions of people still living in absolute poverty, nor has the progress of science and technology been without impact on the resources that are our common heritage. Nations must become learning societies.

2. We believe that one of the central issues continues to be the need to build capacity in developing countries so that they can adapt to the challenges of continuous change. In pursuing this goal, the United Nations Commission on Science and Technology for Development is committed to the common vision of an entitlement to knowledge and to the benefits of science and technology for development in the twenty-first century.

3. To achieve capacity-building, it is necessary to formulate explicit and coherent national science, technology and innovation policies and establish appropriate international frameworks which safeguard and protect the world's population and its resources. Individual States and the United Nations system as a whole should contribute towards this end.

4. An enabling political and economic environment is necessary to nurture science and technology leadership as well as to attract and retain human and financial resources for the development of science and technology.

5. Competitive requirements for firms everywhere in the world have also put greater pressure on Governments to become more transparent, participatory and innovative in policy design, and to pay more attention to policy coherence and to the impact of their policies on people and the environment.

6. In moving towards a world in which the benefits of scientific and technological change are spread more widely across society, public and private institutions will increasingly be called upon to motivate and interact with a larger and more diverse number of actors than in the past, for the process of innovation is interactive and system-wide. Strengthening systems of innovation at all levels and ensuring that their outcomes enhance general welfare will therefore require close cooperation between actors, ranging from Governments at all levels and the scientific, research and development and business communities to non-governmental organizations and other segments of civil society.

7. The ability of economic and social actors to generate and absorb new knowledge is fundamental to the dynamic functioning of innovation systems at all levels. In the area of education, priority should be given to: (a) increased investment in education, especially engineering and science; (b) the promotion of vocational training; and (c) the improvement of the scope and methodology of scientific and technological education. Collaboration with the private sector would be helpful in matching skills and needs.

8. New policies and services will be needed to bring women into the mainstream of technological change. The goal of universal access to basic education for all women, in view of their vital role in many aspects of society and the economy, is particularly important to the process of using and diffusing new knowledge. It will be necessary to remove the obstacles that women encounter in obtaining a university education, pursuing a career in science and engineering, and participating in the decision-making that shapes the direction of scientific and technological change and, more broadly, determines its impact on development efforts.

9. The world of the twenty-first century will be one in which access to knowledge is expanding and becoming less costly. Determining the accuracy and quality of information will become more difficult. As the coverage of patent and copyright protection expands ever more widely to include life forms and data banks, there is a need to raise the legitimate question whether a proper balance is being struck between providing an incentive to invest in knowledge-creation and maintaining the tradition of openness and free exchange of scientific information upon which such systems are based. It will be necessary to provide greater support for research in the public sector particularly in the areas of health and agriculture, to encourage the further development of indigenous knowledge systems and to increase capacities for the assimilation of transferred technology. Research institutions, however, cannot be expected to play both a long-term public research function and an entrepreneurial role aimed at short-term objectives. Experience shows that there will be a need of a mediating function in order to build linkages between the users and producers of knowledge in developing countries, where enterprises are small, their capacity to seek and evaluate information is weak, and their in-house development capabilities are limited. National and local governments all have a role to play in this process, as do international educational and research networks.

10. Links beyond national borders are a critical vehicle for the acquisition by public and private institutions of the knowledge and information required for development. As only a small minority of developing countries have succeeded in attracting significant inflows of foreign investment, more attention will need to be given to alternative channels for acquiring know-how from external sources, such as supplier-customer relationships, licensing, alliances, partnership arrangements and networks for joint research and development, production and distribution. Owing to these linkages, exporting has proved a highly effective means of acquiring technological capabilities. The international community has a role to play in creating new mechanisms to support the flow of technology and in assisting developing countries in becoming more attractive both to foreign investors and to potential trade and technology partners.

11. To build technological and productive capabilities, greater flexibility will be needed in international trade, investment and intellectual property agreements. Developing countries should seek opportunities to promote the transfer and development of technology and take into account the social impact of technological change.

12. Technological innovation should be assessed in terms of its economic, social and environmental impact with the participation of all those concerned. Among the many science- and technology-related topics about which the public has a right to be informed and heard are climate change and the risks and benefits of advances in genetic engineering and in information and communications technologies. Scientists, including social scientists, in developing countries should have the capacity and support to carry out systematic, multidisciplinary impact analysis and risk assessment. International cooperation can be useful in providing assistance in this domain, including in building capacity in developing countries. Appropriate mechanisms to ensure adequate inclusion not only of business, Governments and the scientific community but also of groups traditionally not part of the discourse such as non-governmental organizations, women's groups, minorities and indigenous peoples may be needed to foster the exchange views on the scientific, social and ethical issues of major concern.

13. New ways must be found so that science and technology will serve to improve, through development, the well-being of mankind in the sense of justice, equity and dignity for all peoples and in respect of future generations. The United Nations Commission on Science and Technology for Development should contribute to this process by acting as a forum for: (a) the examination of science and technology questions and their implications for development; (b) the advancement of understanding on science and technology and science and technology policies, particularly in respect of developing countries; and (c) the formulation of recommendations and guidelines on science and technology matters within the United Nations system. In this context, it should also continue to assist Governments from developing countries and countries with economies in transition in reviewing the effectiveness of their systems of innovation at all levels, and by making available information on how linkages within such systems are created and sustained.

14. These are the challenges that will be posed by change in the twenty-first century; they are the challenges facing science and technology if it is to serve the goal of sustainable development.

23. At the same meeting, the Commission adopted a draft resolution entitled "Science and technology for development (see chap. II, paras. 16–20; for the final text, see chap. I, sect. A).

Chapter V
Budget and inter-sessional activities of the Commission

1. The Commission considered agenda item 5 at its 5th and 10th meetings, on 19 and 21 May 1999. It had before it a note by the Secretariat on the budget and inter-sessional activities of the Commission (E/CN.16/1999/5).

2. At the 5th meeting, on 19 May, the Chief, Science and Technology Policy Analysis Section, UNCTAD, made an introductory statement.

3. At the same meeting, statements were made by the representatives of the United States of America, Germany, Sri Lanka and Pakistan.

Chairperson's summary of the general discussion

4. A note on the biennial budget was presented by the secretariat. It dealt with both regular budget and extrabudgetary resources. There are funds for one panel meeting before the end of 1999.

5. The activities of the Commission should not be reduced following its recent downsizing. Steps should be taken to try to ensure that the Economic and Social Council continues to allocate the current level of resources. In addition, more extrabudgetary resources should be sought from donor countries, if the Commission is to continue to do meaningful work. Contributions in kind would also be appreciated.

Action taken by the Commission

6. At its 10th meeting, on 21 May 1999, the Commission adopted a draft resolution entitled "Science and technology for development"(see chap. II, paras. 16–20; for the final text, see chap. I, sect. A).

Chapter VI
Coalition of resources

1. The Commission considered agenda item 6 at its 5th and 10th meetings, on 19 and 21 May 1999. It had before it a note by the Secretariat on the coalition of resources (E/CN.16/1999/6).

2. At the 5th meeting, on 19 May, the Chief of the Science and Technology Policy Analysis Section, UNCTAD, made an introductory statement.

3. At the 5th meeting, on 19 May, statements were made by the representatives of Uganda, Jamaica, Romania, the Islamic Republic of Iran, the Russian Federation, Cameroon, the Philippines and Ghana, as well as the observer for Egypt.

4. At the same meeting, a statement was made by the representative of the United Nations Educational, Scientific and Cultural Organization.

Chairperson's summary of the general discussion

5. The coalition of resources is about mobilizing financial resources as well as human and intellectual resources to support the development of science and technology in developing countries. It involves many stakeholders, including the private sector and civil society. The coalition of resources works better when it is focused on specific and well-defined themes, and this is why the Commission decided to convene a workshop on information and communication technologies (ICTs) in transmission infrastructure, education and health. Three working papers have been prepared on those topics, and the other documents being prepared for the workshop will be published by mid-1999.

6. The need to involve the private sector in the partnership for the coalition of resources was stressed. Development banks, both regional and global, should also participate. Governments from developed countries should allocate a certain percentage of their gross domestic product (GDP) to the development of science and technology. The Governments of developing countries bear the primary responsibility for ensuring sustainability in science and technology funding from within.

7. Focusing on specific themes, such as ICTs for education or health, is a good strategy for a coalition of resources. Other promising strategies are: the adoption of a regional approach to solving common problems; increasing awareness of the importance of the intangible aspects of science and technology among financial institutions; making more efficient use of the financial resources already available; and establishing close relationships between policy makers and the science and technology community.

Action taken by the Commission

8. At its 10th meeting, on 21 May 1999, the Commission adopted a draft resolution entitled "Science and technology for development" (see chap. II, paras. 16–20; for the final text, see chap. I, sect. A).

Chapter VII
Action arising from the third session

1. The Commission considered agenda item 7 at its 5th, 6th and 10th meetings, on 19 and 21 May 1999. It had before it a comprehensive note on the implementation of and progress made on decisions taken at the third session, including follow-up work on information communication technologies and science, technology and innovation policy reviews (E/CN.16/1999/7).

2. At the 5th meeting, on 19 May, the Chief, Science and Technology Policy Analysis Section, UNCTAD, made an introductory statement.

3. At the 6th meeting, on 19 May, statements were made by the representatives of Bolivia, Brazil, Cuba, Romania, the Russian Federation, the United States of America, Sri Lanka, Indonesia, Guinea, Jamaica, Angola, Pakistan, Tunisia and the Islamic Republic of Iran, as well as the observer for Egypt.

Chairman's summary of the discussion

4. With regard to information and communication technologies (ICTs), the Commission had requested developing countries and countries in transition to design a national strategy for ICTs, establish a body to implement the strategy, and prepare a report on the strategy. When the reports were available to the Commission, information on the best practices found in the strategies would be disseminated to other countries.

5. The Commission had also requested United Nations agencies to assess their ability to provide assistance on ICTs and identify the areas in which they would best be able to help. Of the 27 agencies to which a request for information had been sent, 22 had responded, providing information of a general nature rather than assessments. The responses were summarized in document E/CN.16/1999/Misc.3. In 1998, a book entitled *Knowledge Societies: Information Technology for Sustainable Development* was published for the Commission,[10] abridged versions of which were available in French, Spanish and Chinese.

6. Several delegations spoke of ICT-related policies and programmes undertaken in their respective countries. It was suggested that the role of the United Nations in a global telecommunications strategy, especially through the Commission's coordination with the International Telecommunication Union (ITU), could be strengthened. Also, a focal point could be established within the United Nations to provide information to developing countries on ITCs. The Commission was reminded that ICT was only one of the tools of progress and that if it were not used properly it could actually become a problem rather than a solution. Technologies should be used to further both economic and social development.

7. With regard to science, technology and innovation policy (STIP) reviews, Jamaica and Colombia were the two countries for which reviews had been completed. Two more reviews were being launched in Ethiopia and the United Republic of Tanzania. More extrabudgetary resources would be needed to fund new STIP reviews. The methodology used was designed to determine how research and development could be made an integral part of the overall science and technology innovation system. "Innovation" referred to most new entities, including new products, processes and services, used for production in both public and private enterprises.

[10] United Nations publication, Sales No. E.GV.98.O.11.

8. In view of the proven effectiveness of STIP reviews, the Commission should make efforts to raise resources to finance further reviews so that more experience could be gathered and more countries might benefit from them, whether directly or indirectly. Interest was expressed in participating in such a review.

9. Responding to a query on ICT and STIP activities which had been recommended by the Commission at its third session but not completed during the inter-sessional period, the representative of the UNCTAD secretariat explained that: (a) the STIP workshop, which would have been funded from extrabudgetary resources, was being postponed until after the UNCTAD Commission on Investment, Technology and Related Financial Issues, which would deal with policy reviews at its fourth session in October 1999; and (b) letters had been sent to all States Members of the United Nations, as well as to the specialized agencies, requesting information on their ICT activities.

10. With regard to the Gender Advisory Board, activities included assisting countries in putting national and regional gender advisory boards in place. Two such regional advisory boards had been set up, in Indonesia and Uruguay, and a third was being set up in Uganda. The objective was to create networks to make progress on gender-based issues in the field of science and technology. Workshops would be organized to strengthen the networks. The Government of the Netherlands had agreed to provide funding for the three regional centres. Issues still to be discussed included the future of those institutions after the first four years and the participation of Commission members in the Gender Advisory Board, on which the Commission was not currently represented.

11. The extension of the mandate of the Gender Advisory Board, in view of the availability of funds already allocated to it, was proposed. The Board should continue to be closely linked to the Commission.

Action taken by the Commission

12. At its 10th meeting, on 21 May 1999, the Commission had before it the text of a draft decision entitled "Gender Advisory Board" submitted by the Vice-Chairperson of the Commission, Ms. Rolanda Predescu (Romania), on the basis of informal consultations.

13. At the same meeting, before the adoption of the draft decision, the representative of the United States of America made a statement.

14. Also at its 10th meeting, the Commission adopted the draft decision (see chap. I, sect. B, draft decision II).

15. At the same meeting, the Commission adopted a draft resolution entitled "Science and technology for development" (see chap. II, paras. 16–20; for the final text, see chap. I, sect. A).

Chapter VIII

Role and activities of the Commission regarding the coordination of science and technology for development

1. The Commission considered agenda item 8 at its 6th and 10th meetings, on 19 and 21 May 1999. It had before it a note by the Secretariat on the role and activities of the Commission regarding the coordination of science and technology for development (E/CN.16/1999/8).

2. At the 6th meeting, on 19 May, the Chief, Science and Technology Policy Analysis Section, UNCTAD, made an introductory statement.

3. At the same meeting, statements were made by the representatives of Austria, the United States of America, Pakistan and Jamaica.

Chairman's summary of the general discussion

4. The role of coordinator within the United Nations system has always been, and will continue to be, a complicated task. As the coordinator of science and technology activities within the United Nations system, the Commission submits its recommendations to the Economic and Social Council, of which it is a functional body. The Council in turn reviews and transmits these to the General Assembly and to other United Nations organizations and agencies dealing with science and technology issues.

5. As an indispensable component of development, science and technology is rapidly becoming a feature in all aspects of development activities. The Commission should seek more inter-agency interaction not only to fulfil its mandate as coordinator of science and technology activities more effectively, but also to provide leadership and direction in this area. Its effectiveness could be enhanced if the Bureau was more dynamic and if communication between Commission experts during the inter-sessional period was improved. The Commission's work on gender, information and communication technology and biotechnology, for instance, is produced by small groups focusing on specific issues rather than at the sessions of the Commission, which tend to deal more with generalities.

6. In order to enhance the Commission's role as science and technology coordinator, steps should be taken to encourage the participation of United Nations organizations in its various panels. In addition, future sessional reports on substantive agenda items could include an entry on related or similar activities within the United Nations system. The Commission can enhance its role as coordinator only by demonstrating leadership; therefore, the themes chosen for its inter-sessional activities should be useful, timely and realistic. Assisting countries in formulating research and development policies, for instance, is an area in which the Commission could make an impact not only within the United Nations system but also in member States themselves.

Action taken by the Commission

7. At its 10th meeting, on 21 May 1999, the Commission adopted a draft resolution entitled "Science and technology for development" (see chap. II, paras. 16–20; for the final text, see chap. I, sect. A).

Chapter IX

Election of the Chairperson and other officers for the fifth session of the Commission

1. The Commission considered item 10 of the agenda at its 10th meeting, on 21 May 1999.

2. At its 10th meeting, on 21 May, upon nomination by the representative of the Russian Federation (on behalf of the Eastern European States), the Commission elected by acclamation, Mr. Stefan Moravek (Slovakia), as Chairman of its fifth session.

3. At the same meeting, the representatives of Cameroon, Sri Lanka, Jamaica and the United States of America nominated, respectively, the following persons as Vice-Chairpersons of the fifth session of the Commission:

Mr. Pedro Sebastião Teta (Angola)
Mr. Mahmood Molanejad (Islamic Republic of Iran)
Mr. Gerardo Martínez-López (Colombia)
Mr. Bernd Michael Rode (Austria)

4. Also at its 10th meeting, the Commission elected, by acclamation, those who had been nominated as Vice-Chairpersons of the fifth session.

Chapter X

Provisional agenda and organization of work of the fifth session of the Commission

1. The Commission considered item 10 of its agenda at its 9th and 10th meetings, on 21 May 1999. It had before it an informal note by the UNCTAD secretariat containing the draft provisional agenda for the fifth session.

2. At the 9th meeting, on 21 May, statements were made by the representatives of Uganda, Sri Lanka, Tunisia, the Russian Federation, Germany, the United States of America, China, Romania, Jamaica, Spain, Cuba, the Islamic Republic of Iran, Colombia, the Philippines and Guinea.

3. At the 10th meeting, on 21 May, statements were made by the representatives of Cameroon, Sri Lanka, the Islamic Republic of Iran and Romania.

4. At the same meeting, the Chief, Science and Technology Policy Analysis Section, UNCTAD, made a statement.

5. Also at its 10th meeting, the Commission approved the provisional agenda for the fifth session, as orally amended, and decided to entrust the UNCTAD secretariat with the task of completing the provisional agenda in the light of the resolution and decisions adopted by the Commission at its fourth session (see chap. I, sect. B, draft decision I).

Chapter XI

Election of the Chairperson of the fourth session of the Commission

1. At its 1st meeting, on 17 May 1999, following informal consultations and upon the proposal of the temporary Chairperson, the Commission decided to include a new item in the provisional agenda of its fourth session, entitled "Election of the Chairperson of the fourth session of the Commission".

2. The Commission, acting on the nomination put forward by African States, then elected Mr. Henri Hogbe Nlend (Cameroon) as Chairperson of its fourth session (see chap. XIII, para. 12).

Chapter XII

Adoption of the report of the Commission on its fourth session

1. At its 10th meeting, on 21 May 1999, the Commission had before it the draft report of its fourth session, as contained in document E/CN.16/1999/L.1.

2. At the same meeting, statements were made by the representatives of the Republic of Korea and the United States of America.

3. Also at the 10th meeting, the observer for the Organization of African Unity made a statement.

4. At the same meeting, the Commission adopted its draft report on its fourth session, as orally corrected.

Chapter XIII
Organization of the session

A. Opening and duration of the session

1. The Commission on Science and Technology for Development held its fourth session in Geneva from 17 to 21 May 1999. The Commission held 10 meetings (1st to 10th meetings) and a number of informal meetings. The Director of the Division on Investment, Technology and Enterprise Development of the United Nations Conference on Trade and Development (UNCTAD) acted as temporary Chairperson.

2. In his introductory statement, the Deputy Secretary-General of UNCTAD said that scientific and technological advances had profoundly changed the way people lived, and had improved the quality of life in some countries. However, the benefits of scientific knowledge and technology were not available to all, and it would be only by bridging the disparities in the standards of living between countries that international peace and development could be achieved. The importance of the Commission's role, therefore, as a global policy forum and adviser to the Economic and Social Council and the General Assembly on scientific and technological issues could not be overstated.

3. The substantive theme of the current session had been well chosen: there was much to be gained from science and technology partnerships and networking in both a North-South and a South-South context, as underlined at the successful Partners for Development meeting in Lyon in November 1998, which had promoted cross-border and cross-sectoral partnerships between all development actors.

4. It was imperative that the international community should consider ways and means of facilitating the use of new technologies: United Nations organizations were already actively advancing the applications of new technologies in the areas of education, health care, environmental management, trade facilitation, agricultural production, administration and telecommunications.

5. The mastery of technology had become the defining element of sustainable economic and social development. It was therefore fitting that the current session should be addressing the issue of biotechnology, which, if appropriately directed, could help to combine sustainable development with increased output. Meanwhile, the common vision, which it would also be addressing, would provide a long-term perspective on the direction of the work of the Commission in the new millennium.

6. The Director of the Division on Investment, Technology and Enterprise Development said the so-called new working style followed by the Commission for the last five years or so had worked rather well in terms of the active participation of members of the Commission in the carrying out of the work programme and fund-raising, but had not been as effective in terms of diffusing the Commission's outputs. A newly created Web site could help to enhance the diffusion of those outputs in the forthcoming inter-sessional period.

7. The combination of a major development issue, such as biotechnology, with a focus approach on a specific aspect such as food production, had proved an effective way of approaching a single field of activity from multiple and complementary perspectives, and the Commission might like to take a similar approach to the development of a work programme for the next inter-sessional period. In connection with that programme, she noted that the Economic and Social Council, in its resolution 1998/46 of 31 July 1998, had called on the Commission to focus more on capacity-building and the transfer of technology, and had encouraged it to examine activities with practical applications, as well as to cooperate

more closely with, *inter alia*, the Commission on Sustainable Development, the Trade and Development Board and the UNCTAD secretariat.

B. Attendance

8. In accordance with Economic and Social Council resolutions 1998/46 and 1998/47 of 31 July 1998, the membership of the Commission on Science and Technology for Development had been reduced from 53 to 33. Members are to be elected by the Council according to the following geographical distribution: eight members from African States; seven members from Asian States; four members from Eastern European States; six members from Latin American and Caribbean States; and eight members from Western European and other States.

9. In its resolution 1998/47, the Economic and Social Council decided that there would be a drawing of lots for all seats, whether vacant or not, to stagger the terms of office of the new members according to the following pattern:

African States	Four members for four years; four members for two years;
Asian States	Four members for four years; three members for two years;
Eastern European States	Two members for four years; two members for two years;
Latin American and Caribbean States	Three members for four years; three members for two years;
Western European and other States	Four members for four years; four members for two years.

10. The session was attended by 33 States members of the Commission. Observers from other States Members of the United Nations and from non-member States and representatives of specialized agencies and intergovernmental and non-governmental organizations also attended. A list of participants is given in annex I.

C. Election of officers

11. On 22 February 1999, the Commission elected, by acclamation, the following officers for its fourth session:

Vice-Chairpersons

Mr. Bernd Michael Rode (Austria)
Mr. Arnoldo Ventura (Jamaica)
Ms. Rolanda Predescu (Romania)

12. At its 1st meeting, on 17 May 1999, the Commission elected, also by acclamation, Mr. Henri Hogbe Nlend (Cameroon) as Chairperson.

D. Agenda and organization of work

13. At its 1st meeting, on 17 May 1999, the Commission decided to include in its provisional agenda a new item entitled "Election of the Chairperson of the fourth session of the Commission". The Commission then adopted its provisional agenda for the session, as orally amended (E/CN.16/1999/1). The agenda was as follows:

1. Adoption of the agenda and other organizational matters.
2. Substantive theme: "Science and technology partnerships and networking for national capacity-building".
3. Panel on Biotechnology.
4. Common vision on the future of science and technology for development.
5. Budget and inter-sessional activities of the Commission.
6. Coalition of resources.
7. Action arising from the third session.
8. Role and activities of the Commission regarding the coordination of science and technology for development.
9. Election of the Chairperson and other officers for the fifth session of the Commission.
10. Provisional agenda and organization of work of the fifth session of the Commission.
11. Other matters.
12. Election of the Chairperson of the fourth session of the Commission.
13. Adoption of the report of the Commission on its fourth session.
14. At the same meeting, the Commission also approved the organization of work for the session (see document E/CN.16/1999/1/Add.1).

E. Documentation

15. The documents before the Commission at its fourth session are listed in annex II.

Annex I

Attendance

Members

Angola:	Pedro Sebastião Teta, Roland Neto
Austria:	Bernd-Michael Rode, Gerhard Eisl
Belarus:	Galina Butovskaya
Belgium:	Luk Van Langen Hove, Thomas Antoine
Bolivia:	Antonio Saavedra, Ramiro Jordan Mealla
Brazil:	Marilia Sardenberg Zelner Goncalves, Ana Lucy Cabral Petersen, Rodrigo da Costa Fonseca
Cameroon:	Henri Hogbe Nlend, Charles Binam Bikoi, Jean Prosper Tchuikou
China:	Sun Wanhu, Li Xin
Colombia:	Gerardo Martínez López
Cuba:	Daniel Cordorniu Pujals, Luis A. Barreras
Ethiopia:	Shumu Teferra
Germany:	Jörg Meyer-Stamer
Ghana:	Joseph R. Cobbinah
Greece:	Lena Tsipouri
Guinea:	Djibril Moriba, Sékou Camara, Cécé Kpohonou
Indonesia:	Iman Sudarwo, Sugeng Rahardjo
Iran (Islamic Republic of):	Ali Khorram, Mahmoud Molanejad, S. Jalal Alavi
Jamaica:	Arnoldo Ventura
Pakistan:	Tariq-ur-Rahman
Paraguay:	Zoilo Rodas Rodas, Rodrigo Ugarriza, Leticia Casati
Philippines:	Angelina M. Sta. Catalina
Portugal:	Armando Trigo Abreau, Fernanda Sepulveda
Republic of Korea:	Choong-Joo Choi, Ki-chang Kwon, Kong-Rae Lee
Romania:	Rolanda Predescu, Adrian Ciubreag
Russian Federation:	Alexander M. Novikov, Oleg V. Roudensky, Felix E. Grishaev, Iouri P. Kochevoi
Slovakia:	Stefan Moravek
Spain:	Jésus Martinez Frias, Antonio Luis Bullon, María
Sri Lanka:	N. R. Meemeduma, Vijaya Kumar, S. S. Ganegama Arachchi, G. Indikadahena
Tunisia:	Ali Abbab, Rafla Mrabet

Uganda:	Semakula Kiwanuka, J. Kapasi-Kakama
United Kingdom of Great Britain and Northern Ireland:	Peter Hayes
United Republic of Tanzania:	Titus Mteleka
United States of America:	Joan Dudik-Gayoso, William McPherson, Herbert Yarvin

States Members of the United Nations represented by observers

Australia, Bulgaria, Czech Republic, Dominican Republic, Egypt, Equatorial Guinea, Honduras, Hungary, India, Libyan Arab Jamahiriya, Madagascar, Mexico, Morocco, Netherlands, Nigeria, Saudi Arabia, Thailand, Turkey, Uruguay, Venezuela, Yemen, Zambia

Specialized agencies and related organizations

International Labour Organization, United Nations Educational, Scientific and Cultural Organization, United Nations Industrial Development Organization, International Atomic Energy Agency.

United Nations bodies

International Trade Centre, United Nations Conference on Trade and Development/ World Trade Organization

Intergovernmental organizations represented by observers

Arab Labour Organization, European Community, Organization of African Unity, Organization of the Islamic Conference, South Centre

Non-governmental organizations

General consultative status

World Confederation of Labour
World Federation of United Nations Associations

Special consultative status

World Association of Industrial and Technological Research Organizations

Panellists

Mr. Ashok Parthasarahi
Ms. Eliana Fontes
Mr. Chris Chetsanga

Annex II

List of documents before the Commission at its fourth session

Document number	*Agenda item*	*Title or description*
E/CN.16/1999/1	1	Provisional agenda
E/CN.16/1999/1/Add.1	1	Organization of work of the session
E/CN.16/1999/2	2	Report by the UNCTAD secretariat synthesizing the work of the Working Group on Science and Technology Partnerships and Networking for National Capacity-Building
E/CN.16/1999/3	3	Note by the secretariat reporting on the CSTD Panel on Biotechnology for Food Production and its Impact on Development
E/CN.16/1999/4 and Corr.1	4	Note by the UNCTAD secretariat presenting the Vision Statement of the Working Group on a Common Vision for the Future Contribution of Science and Technology for Development
E/CN.16/1999/5	5	Note by the secretariat on the budget and inter-sessional activities of the Commission
E/CN.16/1999/6	6	Note by the secretariat on the Workshop on Coalition of Resources
E/CN.16/1999/7	7	Comprehensive note on the implementation of and progress made on decisions taken at the third session, including follow-up work on information communication technologies and science, technology and innovation policy reviews
E/CN.16/1999/8	8	Note by the secretariat on the role and activities of the Commission regarding the coordination of science and technology for development
E/CN.16/1999/L.1	13	Draft report of the Commission on its fourth session
E/CN.16/1999/Misc.1	4	Summary report by the UNCTAD secretariat on the Expert group meeting on a common vision for the future contribution of science and technology for development
E/CN.16/1999/Misc.2		Note prepared by the secretariat and submitted to the CSTD Panel Meeting on Biotechnology and its impact on development
E/CN.16/1999/Misc.3		Report by the UNCTAD secretariat on technical cooperation activities of the organizations of the United Nations system in the area of information and communication technologies: a synoptic review
E/CN.16/1999/Misc.4	4	Paper prepared for the UNCTAD secretariat on a framework for a common vision for the future contribution of science and technology for development: elements of change and possible responses
E/CN.16/1999/Misc.5	4	Paper prepared by the European Centre for Development Policy Management on making North-South research networks work
E/CN.16/1999/INF/1		Provisional list of participants

99-17696 (E) 160799